CHEMISTRY 4:125 INORGANIC CHEMISTRY

Prof. Lou Messerle
Office: E435 Chemistry Building; phone: 335-1372; eMail: chem-course-messerle@uiowa.edu
Lectures: Tuesday, Thursday 11:30 - 12:20, W228 Chemistry Building
Course credit: 2 semester hours; 3 s.h. optional with additional readings, homework, and literature research assigned by Prof. Messerle
Discussion section/review (no new material presented; review of material from 4:11/12 and 4:125): Wednesday 2:00 - 3:00
Office hours: Tuesday 9:30 - 10:30, Wednesday 10:00 - 11:00, Thursday 1:00 - 2:00; in E427 CB
Course web site: (https://icon.uiowa.edu/) (under construction) This site will have the course syllabus, announcements, PowerPoint lecture slides, class handouts, problem set assignments and solutions, copies of old exams.

Textbook:

Other Useful Textbooks (not required):

An Interesting Personal Account, of relevance to chemists of all stripes (not required for 2 s.h. option):
Oliver Sacks, “Uncle Tungsten”, 2001, Knopf

Molecular Models: A molecular model kit of the type used in organic chemistry will be useful, but usually doesn’t cover the many structures and isomers commonly found in inorganic and organometallic compounds. A special order will be placed for interested students in an inexpensive model set (Darling Models) that is better for constructing realistic models of inorganic molecules, which exhibit far greater structural/geometrical diversity than that observed for organic substances

Course Description
This course is designed to build on the descriptive chemistry taught in introductory chemistry courses and to introduce students to the principles of inorganic chemistry. The Periodic Table and trends in periodicity of various properties of the elements will be used as unifying principles for a survey of the structures, stereochemistry, solid-state chemistry, symmetry, bonding, uses, and chemistry of main group elements, transition metals, lanthanides, and actinides. Contemporary areas of research in inorganic chemistry, including organometallic chemistry, bioinorganic chemistry, and materials science, will be surveyed.

Course Grading:
Two in-class exams, March and April: 40%
Final Exam (comprehensive) 40%
Homework assignments, in-class quizzes, class participation 20%

Exam results will be available from the instructor. Exams not handed out in class may be picked up at the Chemistry Center.
General discussion with classmates on the inorganic concepts being tested in problem set exercises is encouraged, but all problem set submissions must be independent work and in your own words.

+/- Grading system will be used. Final grade distribution will approximate that recommended by the College of Liberal Arts for an intermediate level course (A, 18%; B, 36%, C, 39%, D, 5%; F, 2%; average course GPA = 2.63). Any questions about grades and scores received for course assignments should be directed to Prof. Messerle. Federal privacy rules mandate that individual scores and grades cannot be publicly posted. General class distributions will be posted on the class web site after each exam and individual cumulative scores and an estimated midterm grade may be obtained from Prof. Messerle.

**Tentative Lecture Schedule, subject to change:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Tuesday January 19</td>
<td>course overview, definitions of inorganic chemistry</td>
</tr>
<tr>
<td>Thursday January 21</td>
<td>relationships to other branches of chemistry; applications of inorganic chemistry; molecular structures, ligands, electronic structure</td>
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<tr>
<td>Tuesday January 26</td>
<td>electronic structure, chemical bonding</td>
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<tr>
<td>Thursday January 28</td>
<td>diatomics, polyatomics</td>
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<tr>
<td>Tuesday February 2</td>
<td>polyatomics</td>
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<tr>
<td>Thursday February 4</td>
<td>point group symmetry</td>
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<tr>
<td>Tuesday February 9</td>
<td>point group symmetry</td>
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<tr>
<td>Thursday February 11</td>
<td>point group symmetry</td>
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<tr>
<td>Tuesday February 16</td>
<td>solid-state chemistry</td>
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<tr>
<td>Thursday February 18</td>
<td>solid-state chemistry</td>
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<tr>
<td>Tuesday February 23</td>
<td>solution chemistry</td>
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<tr>
<td>Thursday February 25</td>
<td>experimental methods</td>
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<tr>
<td>Tuesday March 2</td>
<td>experimental methods</td>
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<tr>
<td>Thursday March 4</td>
<td>periodic trends</td>
</tr>
<tr>
<td>Tuesday March 9</td>
<td>hydrogen</td>
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<tr>
<td>Thursday March 11</td>
<td>s-elements</td>
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**SPRING BREAK (March 14-21)**

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<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Tuesday March 23</td>
<td>IN-CLASS EXAM #1</td>
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<tr>
<td>Thursday March 25</td>
<td>p-block elements</td>
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<tr>
<td>Tuesday March 30</td>
<td>p-block elements</td>
</tr>
<tr>
<td>Thursday April 1</td>
<td>Sc, lanthanide, actinide chemistry</td>
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<tr>
<td>Tuesday April 6</td>
<td>transition metal electronic, periodic properties</td>
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<tr>
<td>Thursday April 8</td>
<td>transition metal chemistry; first period</td>
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<tr>
<td>Tuesday April 13</td>
<td>transition metal chemistry; second, third periods</td>
</tr>
<tr>
<td>Thursday April 15</td>
<td>crystal field and ligand field theories, high spin vs low spin, magnetism</td>
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<tr>
<td>Tuesday April 20</td>
<td>inorganic reaction mechanisms</td>
</tr>
<tr>
<td>Thursday April 22</td>
<td>main group, transition metal organometallic chemistry</td>
</tr>
<tr>
<td>Tuesday April 27</td>
<td>IN-CLASS EXAM #2</td>
</tr>
<tr>
<td>Thursday April 29</td>
<td>transition metal organometallic chemistry, catalysis</td>
</tr>
<tr>
<td>Tuesday May 4</td>
<td>bioinorganic chemistry</td>
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<tr>
<td>Thursday May 6</td>
<td>environmental inorganic chemistry</td>
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Review session: mutually convenient time during final week of classes

**FINAL EXAM: 7:30 AM, Monday, May 10, 2010**
Course Administration
Please go to the Chemistry Center, 231 CB, for drop/add signatures, make-up exam
scheduling, handouts, alternate textbooks, section changes, and tutor lists. M-F, 8:00 AM-
12:00, 1:00-5:00 PM (F, 4:30 PM). Manager: Lin Pierce (335-1341, lin-pierce@uiowa.edu).

Special Needs
Students with disabilities requiring modification of seating, testing, or other course
arrangements should contact the Office of Student Disability Services, lower level of Burge
Hall (335-1462), and then go to the Chemistry Center, CB 231. (www.uiowa.edu/~sds)

Complaints
Complaints and appeals regarding the course, instructors, or TAs can be filed with the
Departmental Executive Officer at the Department of Chemistry administrative office,
Room E459 CB (335-1350). Students are encouraged to first meet with professors with their
concerns about course aspects, TAs, lectures, or exams.

Miscellaneous
Please feel free to discuss with Prof. Messerle any aspect of the course that is of concern or
causing you problems. DON'T HESITATE to come to office hours to ask questions that are
not covered during class. The Schedule of Courses describes a procedure to contact the
chair of the Chemistry Department (Prof. David Wiemer, room E331) if you have an issue
that we cannot resolve. If you require course adaptations or accommodation (for example,
with exam taking) because of a recognized disability, please contact Prof. Messerle who will
make every effort to accommodate your needs. Class attendance is expected, and poor
attendance will result in grade reduction. Make-up exams will be given for documented
cases of illness, family emergencies, mandatory religious obligations, and authorized
University activities (e.g., participation in intercollegiate sports, when accompanied by a
request from the Athletics Department). Please contact Prof. Messerle before or
immediately after the missed work or exam.

COLLEGE OF LIBERAL ARTS AND SCIENCES: POLICIES AND PROCEDURES

Administrative Home of the Course: The administrative home of this course is the College of
Liberal Arts and Sciences, which governs academic matters such as add/drop deadlines,
second-grade-only option, academic fraud, and other related issues. Different colleges
might have different policies. Questions may be addressed to 120 Schaeffer Hall or see the
Student Academic Handbook:
www.clas.uiowa.edu/students/academic_handbook/index.shtml

Electronic Communication: University policy specifies that students are responsible for all
official correspondences sent to their standard University of Iowa e-mail address
(@uiowa.edu). Students should check their account frequently.

Academic Fraud/Misconduct: Plagiarism and other activities when students present work
that is not their own are academic fraud. Academic fraud is a serious matter and is
reported to the Chemistry DEO and to the Associate Dean for Undergraduate Programs
and Curriculum. Instructors and DEOs decide on appropriate consequences at the
departmental level while the Associate Dean enforces additional consequences at the
collegiate level. See the CLAS Student Academic Handbook. The College of Liberal Arts &
Sciences academic misconduct policy is available at:
www.clas.uiowa.edu/students/academic_handbook/ix.shtml#1
Academic misconduct may result in a grade reduction and/or other serious penalties, up to
and possibly including expulsion from the University of Iowa.
Examinations: You are expected to work alone. Cheating will not be tolerated. The instructor believes strongly in fairness for all students and objective appraisal of individual performance and understanding of course material.

Making a Suggestion or a Complaint: Students have the right to make suggestions or complaints and should first visit an instructor, then the Chemistry DEO. Complaints must be made within six months of the incident. See the CLAS Student Academic Handbook.

Accommodations for Disabilities: A student seeking academic accommodations should first register with Student Disability Services and then meet privately with an instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Understanding Sexual Harassment: Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Comprehensive Guide on Sexual Harassment at www.uiowa.edu/~eod/policies/sexual-harassment-guide/index.html for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather: In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over.

Resources for Students:
- Writing Center: 110 English-Philosophy Building (EPB), 335-0188, www.uiowa.edu/~writingc
- Speaking Center: 12 EPB, 335-0205, www.uiowa.edu/~rhetoric/centers/speaking
- Mathematics Tutorial Laboratory: 314 MacLean Hall, 335-0810, www.uiowa.edu/mathlabTutor
- Tutor Referral: Campus Info Center, IMU, 335-3055, www.imu.uiowa.edu/cic/tutor_referral_service
- College of Engineering Tutoring Program: www.engineering.uiowa.edu/sdc/tutoring.php
- Supplemental Instruction: cde.uiowa.edu/index.php/si.html
- University Housing Tutoring: housing.uiowa.edu/departments/reslife/academic_initiatives.html

Student Classroom Behavior: The ability to learn is lessened when students engage in inappropriate classroom behavior, distracting others; such behaviors are a violation of the Code of Student Life. When disruptive activity occurs, an instructor has the authority to determine classroom seating patterns and to request that a student exit the classroom, laboratory, or other instructional area immediately for the remainder of the period. One-day suspensions are reported to Departmental, Collegiate, and Student Services personnel (Office of the VP for Student Services and Dean of Students).

University Examination Policies
Missed exam. University policy requires that students be permitted to make up exams missed because of illness, religious obligations, certain University activities, or unavoidable circumstances.

Final Examinations. A student with two final examinations scheduled for the same period or more than three examinations on the same day may file a request for a change of schedule before the published deadline at the Registrar's Service Center, 17 Calvin Hall, 8-4:30 M-F (384-4300).